

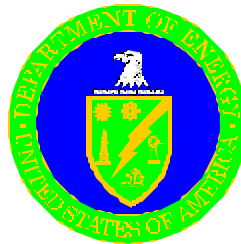
U.S. Department of Energy



Office of Science

HIGH ENERGY PHYSICS PROGRAM

High Energy Physics Advisory Panel



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February 9, 2004



Recent Appropriations History (B/A in Millions)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Congressional Budget Request	\$ 725.0	\$ 738.0	\$ 737.4
House Appropriations Bill	725.0	748.0	
General Reduction (HEP share)	<u>- 5.6</u>	<u>-0.2</u>	
Net	\$ 719.4	\$ 747.8	
Senate Appropriations Bill	\$ 730.0	\$ 738.0	
General Reduction (HEP Share)	<u>-3.4</u>	<u>--</u>	
Net	\$ 726.6	\$ 738.0	
Conference Committee	\$ 727.0	\$ 738.0	
General Reduction (HEP Share)	-4.4	**	
Rescission (HEP Share)	<u>-4.7</u>	<u>-4.3</u>	
	\$ 717.9	\$ 733.6	
Appropriation after reductions	\$ 717.9	733.6*	
SBIR & STTR	<u>-15.9</u>		
Net Funding Available	702.0		

*Includes \$1.2M of prior year balances

**HEP share of FY04 general reduction was addressed using prior year balances



FY 2004 Budget Update

- ✍ After a lengthy Continuing Resolution, Congress passed the DOE budget for FY 2004 which was signed by the President in December 2003.
- ✍ But final budget numbers were not “known” until the Omnibus spending bill and its associated rescission were passed in January.
- ✍ Final Results:
 - ✍ Office of Science \$3.50B (up \$178M or 5.4% from FY03; most of increase in Biological and Environmental Research)
 - ✍ HEP \$738M (up \$20M or 2.8% from FY03 Enacted)
- ✍ But...
 - ✍ Less \$4.3M rescission (HEP share) (~0.6%)
 - ✍ Hence net HEP FY04 budget (ignoring prior year carryover) is UP ~ 16M\$, +2.2% from FY03



FY 2005 HEP Budget

- ✍ President's FY 2005 budget released Feb 2
 - ✍ Office of Science \$3.43B (DOWN \$68M or 2% from FY04 if Congressionally-directed projects – “earmarks” – are included, UP \$78M or 2.2% if not; see next slide)
 - ✍ HEP \$737M (up \$3.8M or 0.5% from FY04)
 - ✍ Most SC programs are below constant level-of-effort (see next slide)
 - ✍ Detailed HEP breakouts follow



Recent Office of Science Budgets

(B/A in Millions)

	FY03	FY04 Enacted	FY05 Pres.	% Change (05-04)
Advanced Computing	163.2	202.3	204.3	+1.0
Biological and Environ., Total (non-earmark)	494.4 (442.4)	641.5 (500.7)	501.6 (501.6)	-21.8 (+0.2)
Basic Energy	1001.9	1010.6	1063.5	+5.2
Fusion	240.7	262.6	264.1	+0.6
High-Energy	702.0	733.6	737.4	+0.5
Nuclear	370.7	389.6	401.0	+2.9
Office of Science* (non-earmark)	3322.2 (3270.3)	3500.2 (3359.4)	3431.7 (3431.7)	-2.0 (+2.2)

*Total includes funding for Infrastructure, Program Direction, Safeguards and Security, Workforce





Other Federal Budget Numbers (B/A in Billions)

	FY03	FY04 Enacted	FY05 Pres.	% Change (05-04)
TOTAL Federal Budget	2,158	2,319	2,400	+3.5
Discretionary	758	787	818	+3.9
Defense + Homeland Sec.	389	403	432	+9.4
Other Discretionary	370	384	386	+0.5
Dept of Energy	22.2	23.3	23.6	+1.2
Office of Science	3.3	3.4	3.4	+2.2




FY 2005 Budget Priorities

Tevatron Run II program :

-  Strong support for operations with emphasis on integration of Run II accelerator upgrades, and maintenance/repair of accelerator infrastructure
-  Support (de-scoped) upgrades for Run IIb detectors




B-Factory program:

-  Support operations and upgrades of PEP-II accelerator and BaBar (*but note less running due to anticipated increase in power costs; see next slide*)

Prepare for U.S. participation in LHC physics

-  Continued significant increases for LHC Pre-operations and software and computing activities




New initiatives, aligned with *Facilities for the Future of Science*

-  BTeV begins engineering design in preparation for fabrication in 2006 (*IF cost, technical, schedule reviews are passed AND outyear budgets permit*)
-  Continued R&D for SNAP prototypes in preparation for JDEM (but NOT in NASA FY05 budget...)
-  Lattice QCD (?)






FY2005 Budget Impacts

To help support high-priority activities in FY2005, some reductions were taken:

-  Reduced level of effort in non-accelerator research
-  Reductions in other accelerator and detector R&D activities (unrelated to high-priority items mentioned above)
-  Take advantage of completion of NuMI/MINOS

Open Questions

-  *How will labs and universities handle lower effective research budgets?*
 - Salary inflation continues to outpace budgets, little flexibility in equipment
-  *Will performance of facilities be impacted?*
 - e.g., SLAC estimates power costs up ~\$4-7M in FY05 with less than flat HEP budget;
-  *What (and when) is the next large collaborations with NASA?*



FY 2004/5 Budget (New Budget and Reporting Structure) (B/A in Millions)

	<u>FY 2004</u>	<u>FY 2005</u>	<u>% Change</u>
Proton Accelerator-based Physics			
Research	\$ 73.3	\$ 74.0	
Facilities (other than LHC)	253.1	276.1	
LHC	48.8	32.5	
LHC Support	15.4	29.4	
<i>Subtotal</i>	\$ 390.6	\$ 412.1	+5.5%
Electron Accelerator-based Physics			
Research	\$ 28.1	\$ 28.8	
Facilities	117.6	122.1	
<i>Subtotal</i>	\$ 145.7	\$ 150.9	+3.6%
Non-Accelerator-based Physics/Research	\$ 49.4	\$ 42.9	-13.1%
Theoretical Physics/Research	\$ 47.6	\$ 49.6	+4.2%
Advanced Technology R&D/Research	\$ 87.9	\$ 81.1	-7.8%
Construction/NuMI	\$ 12.4	\$ 0.8	
TOTAL HEP Budget	\$ 733.6	\$ 737.4	0.5%
SBIR & STTR (included in Advanced Tech R&D)	\$ (17.4)	\$ (17.5)	



FY2004/05 HEP Budget by “Site”

(B/A in thousands)

	FY04	FY05	Diff (05-04)	% change	Comment
ANL	8,218	7,966	-252	-3.1	
BNL	15,092	15,108	+16	+0.1	
LBNL	36,451	35,920	-531	-1.5	
FNAL	287,562	293,931	+6,369	+2.2	Run II Ops/Upgrades + BTeV
SLAC	168,982	168,258	-724	-0.4	Includes BaBar IFR Upgrade
“Universities”	116,467	116,094	-373	-0.3	Includes “small labs” + NIST, Smithsonian,...
SciDAC	4,600	6,600	+2,000	+43.5	Lattice QCD
LHC	64,200	61,900	-2,300	-3.6	Includes LHC Research Program
SBIR/STTR	17,582	17,505	-77	-0.4	
Other	14,477	14,098	-379	-2.6	Undistributed funds and program support



P5 Recommendations and DOE Response

- ✍ On January 21, 2003, P5 was asked to review and prioritize three projects at Fermilab:
 - The Run II CDF and D-Zero detector projects. (These projects had been partially approved by DOE; the issue before P5 was full construction start in FY 2004.)
 - BTeV
 - Charged Kaons at the Main Injector (CKM)
- ✍ On October 2, 2003, P5:
 - Strongly endorsed the upgrades of the trigger, DAQ and offline systems, but did not support the silicon detector upgrades.
 - Supported the construction of BTeV as an important project in the worldwide quark flavor physics area, and strongly recommended an earlier BTeV construction profile subject to constraints within the HEP budget.
 - Did not recommend proceeding with CKM, based on current budgetary models.



P5 Recommendations and DOE Response (Cont'd)

DOE Response:

- The CDF and D-Zero detector upgrades have been descoped with the trigger and data acquisition subprojects continuing. D-Zero will receive one new layer of silicon between the beampipe and the existing silicon vertex detector. CDF will continue with its existing silicon vertex detector.
- For BTeV, \$10.3M is included in the President's FY 2005 budget for R&D and detailed engineering. In addition, both Lehman reviews of BTeV and a Fermilab operations review are scheduled in 2004, to guide follow-up decisions.
- CKM is not funded.

 These decisions are consistent with SC's "*SC's Facilities for the Future of Science: A Twenty-year Outlook.*"



Budget Outlook

- ✍ **This is an excellent program with the world's leading research facilities.**
- ✍ **It will be a challenge to manage this program, assuming continued ~flat budgets for Science**
 - ✍ Little “roll-off” left from detector fabrication activities
 - ✍ Budget pressure on research and operations
 - ✍ Difficulty in supporting new initiatives
 - ✍ R&D base for the long-term future of field?
- ✍ **We need to start making the necessary decisions NOW**
 - ✍ What is the future of the major operating U.S. facilities?
 - ✍ What are the roles and contributions of HEP programs at multi-purpose labs?
 - ✍ What is the appropriate level/mix of accelerator and detector R&D efforts?
 - ✍ Outyear funding for new initiatives is not guaranteed...what is the best program strategy?
- ✍ **We will be asking HEPAP for advice and scientific prioritization.**

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Backup Slides



FY 2003/04 HEP Budget by “Site”

(B/A in Thousands)

	FY03	FY04	Diff (04-03)	% change	Comment
ANL	8,324	8,218	-106	-1.3	
BNL	17,449	15,092	-2,357	-13.5	
LBNL	34,366	36,451	+2,085	+6.1	Mostly SNAP
FNAL	289,706	287,562	-2,144	-0.7	
SLAC	159,146*	168,982	+9,836	+6.2	BFactory Ops/Upgrades
“Universities”	118,212**	116,467	-1,745	-1.5	Includes “small labs” + NIST, Smithsonian,...
SciDAC	4,785	4,600	-185	-3.9	
LHC	66,510	64,200	-2,310	-3.5	Includes LHC Research Program
SBIR/STTR	15,883	17,582	+1,699	+10.7	SBIR rate increased FY04
Other	3,540	14,447	+10,937		Undistributed FY03 funds rolled into FY04

*Does not include \$2,271 of transfers for: Linear Collider R&D, BaBar Ops, and GLAST

**Includes \$1,871 for Linear Collider R&D, BaBar Ops, GLAST in FY03 (but not in FY04, yet)



NOTES FOR BUDGET TABLES

1. The numbers shown do not in general reflect:
 - A. Transfers of capital equipment from labs to universities for large detector (e.g., CDF, D-Zero) fabrication, except as noted.
 - B. Incremental funding for conferences, detailees to DOE Headquarters, etc.
 - C. Special help provided during the year. FY04 data is current through December 2003.
 - D. Allocation of LHC or SciDAC funding except as noted.
2. Totals in columns may not add due to round-off error.